

MODULAR REFUSE CONTAINER

Cross Reference to Related Application

5 This application claims priority from United States Provisional Patent Application No. 60/454,323 filed March 14, 2003 and Canadian Patent Application No. 2,432,197 filed June 13, 2003 entitled Modular Refuse Container.

Field of the Invention

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 This invention relates to the field of refuse containers referred to as dumpsters, and in particular to an improved refuse container of modular design.

Background of the Invention

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 Conventional so-called dumpsters, that is, metal refuse containers for storing garbage prior to pick up by a garbage truck, are well known. Such containers are conventionally welded together so as to seal their contents and lend rigidity to the container because the container has to withstand very rough treatment. Damage to dumpsters is very
20 common. For example, in conventional dumpsters the corners often rust out, resulting in the welded dumpsters being discarded entirely, or often dumpsters are marred by graffiti and have to be refurbished. One of the drawbacks with welded fabrication is that the cost to ship the finished containers quite often is of the same order of magnitude as the cost to manufacture them.

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 In the prior art applicant is aware of United States Patent No. 4,913,301 which issued to Pickler on April 3, 1990 for a Refuse Container, United States Patent No. 3,782,579, United States Patent No. 2,540,698 which issued to States on February 6, 1951 for a Combination Receptacle and Bin and Great Brian Patent No. 594,221 to Harvey accepted

November 5, 1947 for Improvements in Bunkers, Bins and like Receptacles. What is neither taught nor suggested, and which it is an object of the present invention to provide, is the improved rigidity in a modular dumpster as exemplified by the embodiment set out below.

5 Summary of the Invention

10 The present invention is a modular dumpster which may be bolted together within a relatively short period of time by the end user with the resultant dumpster sufficiently rigid so as to provide a replacement for conventional dumpsters of welded fabrication. The rigidity is enhanced by the cross-bolting, that is the orthogonal bolting alignment in a horizontal plane, of a pair of cross bolts in each of the four upper corners of the container. At least one of each pair of cross bolts in each corner passes through a rigid bolt brace, which in one embodiment includes a parallel array of four rigid plates formed by the mounting and bracing of rigid channels or tubes along the upper edges of the front, rear and side panels of the container. In this fashion a corresponding bolt hole must pass through the four rigid plates, at least three of which are spaced apart to provide structural stability and rigidity to each modularly constructed upper corner of the container. The lower corners of the container and seams between the panels are modularly fastened by bolting of adjacent panels to each other and to the floor around the lower circumference of the container.

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25 The modular dumpster according to the present invention allows for the shipping of dismantled dumpsters so that many more dumpsters may be shipped for the same freight cost as compared to the shipping of the finished welded dumpsters. Thus for a given flat rate for shipping by truck, where, in the past, a typical truck load was approximately 20 welded containers per truck (more if they are four yard containers and less if they are six yard containers), in shipping dismantled dumpsters the truck can be loaded up to its weight limit. Thus, for example, if a dismantled dumpster weighs approximately 750 lbs., and the weight limit of the truck is 94,000 lbs., then approximately 125 containers may be shipped per truck load.

A further advantage of the modularity of the dumpster of the present invention is that the panels and lids are interchangeable so that, whereas in the past if a side panel or lid of a welded dumpster became damaged, the entire dumpster had to be destroyed or returned to the fabricators, if a panel or floor of the dumpster of the present invention becomes damaged, that component may be simply replaced by the end user. In the modular design of the dumpster of the present invention, the front and back walls may be sized for a common fit as between all of the various models, that is, two yard (standard), three yard, four yard, six yard, and eight yard containers, whether they have square tops or so-called cathedral tops, wherein 3 yard front and back panels, 4 yard square front and back panels, 4 yard slope front, cathedral 6 yard front and back panels, are interchangeable, and wherein 4 yard slope back, 6 yard square front and back panels, 8 yard square and cathedral front & back panels are interchangeable.

In summary then, the rigid modular container, whether assembled or in a disassembled kit form for later assembly, according to the present invention may be characterized as including a floor and an opposite lid, and between the floor and lid opposite rigid rectilinearly-shaped first and second panels, and oppositely disposed rigid rectilinearly-shaped third and fourth panels extending from and between the first and second panels. The panels are removably mounted to the floor. The side edges of adjacent panels are removably mounted to each other as by bolting so that the side edges of the third and fourth panels abut the side edges of the first and second panels. Fastener bracing means such as bolt bracing are mounted to the side edges of the panels and are aligned between adjacent the panels so that fastener receiving apertures therethrough provide for rigid bracing of rigid fasteners such as bolts mounted through and between the fastener bracing means on the adjacent panels. Rigid fasteners such as bolts may thus be mounted through the fastener bracing means on the adjacent the panels. The fastener bracing means on the first and second panels may be mounted on outside surfaces of the first and second panels. The fastener bracing means on the third and fourth panels may be mounted on the inside surfaces of the third and fourth panels. The panels may form a cuboid, that is, a generally rectangular parallelepiped.

The fastener bracing means may include a first panel hollow reinforcing member and a second panel hollow reinforcing member mounted across, and on an outer surface of, the first and second panels respectively so as to extend from the opposite side edges of each the first and second panels. Each end of each reinforcing member may have, mounted in parallel across each end, a first reinforcing insert and a rigid end enclosure so that the each end is a reinforced end. On the third and fourth panels, the fastener bracing means may include third and fourth panel hollow reinforcing members mounted across the third and fourth panels respectively. Each of the third and fourth panel hollow reinforcing members are mounted on an inner surface of the third and fourth panels respectively. Each of the third and fourth panels may have rigid flanges formed along opposite side edges thereof. The rigid flanges extend orthogonally relative to the third and fourth panels and inwardly into the container. Ends of the third and fourth panel hollow reinforcing members may be adjacent for example so as to abut corresponding rigid flanges. Second reinforcing inserts may be mounted in each end of the third and fourth panel hollow reinforcing members, the reinforcing members aligned so as to horizontally align the fastener receiving apertures formed through each of the first and second panel hollow reinforcing members, the first and second panels, the rigid flanges and each of the second reinforcing inserts.

In one embodiment the reinforcing members are mounted along an upper end or uppermost edge of the panels. In particular, they may be mounted continuously along the uppermost edges of the panels so as to contiguously strengthen an upper opening of the container defined by the upper edges of the panels. Further, the reinforcing members may be channels rigidly mounted along their edges to the panels.

In one embodiment not intended to be limiting, the first and second panels are, respectively, front and back panels and the third and fourth panels are side panels of the container. The side panels may further include a bolt-on parallel pair of fork-receiving rigid

pockets mounted horizontally to the side panels for receiving therein the forks of a front-load truck.

5 The first and second panels may each further include a lip extending along each the side edge of the first and second panels so as to overlap an outer surface of the side edges of the third and fourth panels. Each lip may have at least one fastener aperture therein, and the third and fourth panels would then also have corresponding fastener apertures therein aligning with the fastener apertures in each lip. Second fasteners, which again may be bolts, may be mounted therethrough. Thus in one embodiment the fastener apertures are bolt holes sized to
10 snugly receive bolts journalled therethrough either into threaded engagement therein or so as to protrude for threaded engagement with corresponding threaded nuts.

The floor may be planar and may have at least one stiffening rib mounted or formed there-across. The floor may have a circumferentially extending upstanding rim around
15 its outer circumference for overlapped mating with lowermost edges of the panels. An aperture may be formed in an upstanding rim adjacent the floor, for cooperative alignment with a corresponding apertured formed in a side panel for moisture drainage. These apertures may be securely closed by means of a plug. The rim may be fastened by fasteners such as bolts to the lowermost edges of the panels. Advantageously, the first and second panels may
20 be of a constant and equal first size, and the third and fourth panels may be of an equal second size. The size of the third and fourth panels may be varied to vary the volume of the container.

By means of sloping side wall extensions, the dumpster may be easily converted for use as a recycling container for cardboard and the like in a manner which
25 restricts insertion of unwanted refuse.

For use as a recycling bin, the container may include a pair of rigid wedge-shaped extensions mounted onto upper edges of one pair of the oppositely mounted panels, and a lid mounted on hinge means to an upper edge of the other pair of the oppositely

mountable panels so that, when the lid is pivoted the hinge means to a closed position over the container, a front edge of the lid defines an open horizontal slot. Releasable locking means may be provided for lockably closing the lid down onto the extensions.

5 Brief Description of the Drawings

Figure 1 is, in perspective view, one embodiment of a modular waste container assembled and braced according to the present invention.

10 Figure 2 is, in front elevation view, the waste container of Figure 1.

Figure 3 is, in right side elevation view, the waste container of Figure 1.

15 Figure 4 is, in partially cut away plan view, the waste container of Figure 1.

Figure 5 is, in an enlarged and partially exploded and cut away view, the upper front right corner of the waste container of Figure 1.

20 Figure 6 is a cross sectional partially cut away view along line 6-6 in Figure 5.

Figure 7 is a cross sectional partially cut away view along line 7-7 in Figure 5.

Figure 7a is a perspective view of one form of upper reinforcing bar.

25 Figure 8 is, in enlarged partially exploded and cut away view, the upper rear right corner of the waste container of Figure 1.

Figure 9 is a cross sectional view along line 9-9 in Figure 8.

Figure 10 is, in a perspective partially cut away view, the lower right front corner of the floor panel of the waste container of Figure 1.

Figure 11 is, in enlarged partially exploded and cut away perspective view, the right fork receiver of the waste container of Figure 1.

Figure 12 is in frontal elevation the waste container with lid in the closed position, assembled for receiving recyclable materials.

Figure 13 is a cross sectional view along line 13-13 of Figure 12.

Figure 14 is a cross sectional view along line 14-14 of Figure 13.

Figure 15 is, in perspective view, a sloping sidewall extension from Figure 12.

Detailed Description of Embodiments of the Invention

With reference to the drawings wherein similar characters of reference denote corresponding parts in each view, the modular dumpster according to the present invention is illustrated by way of example in Figure 1, with corresponding views in Figures 2-11. As better explained below, the illustrations are representative of the invention without intending to be limiting as to the type of dumpster to which the invention would apply. Thus in Figure 1 dumpster 10 is illustrated as having flat hinged lids 12a and 12b, it being understood that other types of dumpsters, for example, so-called cathedral top dumpsters, or dumpsters having inclined covers, whether they be of metal, plastic or other material, and whether they be three yard, four yard, six yard or other sizes are intended to also fall within the scope of the present invention. By way of further example then, side panels 14a and 14b are modularly bolted to front and rear panels 16a and 16b respectively so that, depending on the size of the side panels or on the size of the front and rear panels, the volume of the dumpster may be modified. In

one preferred embodiment, the size of front and rear panels 16a and 16b remains constant and the width of side panels 14a and 14b may be selected so as to provide for example a three yard dumpster, or a four yard dumpster, or a six yard dumpster.

5 A pair of channel members 18 are rigidly bolted to side panels 14a and 14b so as to accept, in releasably slidably journalled engagement therein, the forks of a conventional truck-mounted dumpster unloader. In the present invention, advantageously channel members 18 are mounted, by bolts 20, (only one of which is illustrated in Figure 11 for clarity of the illustration) through corresponding holes in the corresponding side panel and through base
10 plate 22. Bolts 20 threadably engage corresponding nuts (not shown) on the inside of the corresponding base plate 22.

As better seen in Figures 4 and 10, the rigid floor panel 24 of the dumpster is reinforced by stringers 26 which may be formed out of the floor panel or may be separate
15 pieces rigidly mounted thereon so as to extend from the front panel to the rear panel. Optional wheels 28, which may be casters, are rotatably mounted on mounting brackets 30 which themselves are bolted to the underside of floor panel 24 in all four corners of the floor panel. The circumferential edges of the floor panel 24 are formed as upturned rim flanges 24a having a spaced apart array of bolt holes 24b formed therealong. Corresponding bolt holes are formed
20 along the lower circumferential edges of the front, rear and side panels so that the front, rear and side panels may be bolted onto rim flanges 24a. A moisture drainage aperture 29 and suitable plug is positioned adjacent floor panel 24 in one of the side panels, for example panel 14b. A cooperatively aligned aperture is also formed in the circumferential edge of the floor panel.

25 Each side panel has a reinforcing bar 32 rigidly mounted along the upper edge of the side panel, on the inside surface of the side panel. Each side panel has an inwardly turned rigid flange 34 formed along the length of its opposite front and rear edges. Reinforcing bar 32 extends between the front and rear rigid flanges 34 and is rigidly mounted

thereto. Reinforcing bar 32 has a sloped lower edge 32a which slopes downwardly towards the floor panel. Sloped edge 32a is inclined downwardly towards the floor panel of the dumpster so that when the dumpster is inverted to unload its contents, the contents will not hang up or catch against the reinforcing bar. In a preferred form reinforcing bar 32 may be secured to sidewalls 14 by either spot welding or by epoxy. To facilitate such connection, tabs 33 are integrally formed at the upper and lower edges of bar 32 and provide a contact surface for positioning against the exterior surface of side walls 14a and 14b. Similarly, front and rear reinforcing tubes 40 may be provided with similar connection tabs 41. As may be viewed in Figure 6, lower connection tab 41a may optionally extend internally or externally of tube 40.

Each rigid flange 34 on each side panel has a depth dimension d_1 . Rigid flanges 34 snugly mate so as to be nested against inwardly turned rigid flanges 36 and 38 on rear panel 16b and front panel 16a respectively. Flanges 36 are formed on both side edges of the rear panel. Flanges 38 are formed on both side edges of the front panel. Each rigid flange 36 has a corresponding depth dimension d_2 . Rigid flanges 38 have corresponding depth dimensions d_3 .

Horizontal reinforcing tubes 40 are mounted along the upper edges of front and rear panels 16a and 16b so as to extend from each side edge of each front and rear panel. Each end of reinforcing tubes 40 have, mounted in parallel across each end, reinforcing plates inserts such as 40a and end enclosures such as plates 40b forming reinforced ends of tubes 40 through which bolts may be rigidly mounted. Horizontally aligned bolt holes 42a, aligned along axis A are formed through, respectively, the outermost surface of reinforcing tubes 40, and through the sheeting of the front and rear panels 16a and 16b. Corresponding bolt holes continue through rigid flanges 34 and through reinforcing plates 32b mounted within reinforcing bars 32. Bolts 44 may then be inserted through bolt holes 42a and 42b so as to threadably engage, for example, threading within the bolt holes in reinforcing plates 32b or through for example threaded nuts (not shown) welded to plates 32b. The front panel is thereby bolted onto the side panels with rigid flanges 38 overlapped onto the front edges of the side panels. Overlapping rigid flanges 38 along the front edges of the side panels snugly

engages rigid flanges 34 against the inner surfaces of front panel 16a so as to snugly nest the vertically extending corners formed between rigid flanges 34 and the front edges of the side panels into the corresponding corners formed between rigid flanges 38 and the front surface of front panel 16a. Similarly, flanges 36 on rear panel 16b overlap corresponding flanges 34 on the side panels so as to nest flanges 34 into the vertical corners along the vertical edges of rear panel 16b, bolts 44 bolting the rear panel onto the side panels through bolt holes 42b.

With the corners so snugly nested, dimension d_1 of rigid flanges 34 provides sufficient area so that bolt holes 42a in rigid flanges 34 may be aligned with bolt holes 42a in reinforcing tube 40. Similarly, dimension d_3 of rigid flange 38 provides sufficient area so that the vertically spaced apart array of bolt holes 46a on the side panels may be aligned with bolt holes 46b formed in rigid flanges 36 and 38 for bolting therethrough of bolts 48. In this manner, each of the upper four corners of dumpster 10 are rigidly formed by the rigid interlocking mating and bolting of the front and rear panels and their respective flanges 38 and 36 with the corresponding side panels and their rigid flanges 34, each corner being rigidly fastened by the orthogonally oriented threaded coupling of bolts 44 through bolt holes 42b and bolts 48 through bolt holes 46a and 46b along their respective axes A and B. Bolts 48 are fastened through bolt holes 46a, and 46b by for example the use of threaded nuts (not shown) on the inside of the container behind flanges 34. The fully assembled dumpster has all apertures sealed to prohibit ingress of crawling insects such as ants.

The reinforcing plates and end plates serve to brace the ends of the hollow reinforcing tubes and bars. Thus when bolts are inserted through the array of bolt holes, that is in all of the reinforced ends, twisting or other relative movement between adjacent panels is resisted because each bolt is held rigidly aligned relative to each panel by the alignment of four bolt holes per bolt, two holes per panel. Of course the same result may be achieved, with a weight gain, by the use of bored solid ends on the reinforcing tubes or bars where the solid ends each have a bolt receiving bore, or by just the use of bored solid ends or brackets without the corresponding reinforcing tubes or bars. Further, the reinforcing tubes or bars may also be

channels or the like welded to the panels, it being intended herein that reference to reinforcing tubes or bars is to include within its scope stiffening or other reinforcing members or means, and that reference herein to fastener bracing means or bolt bracing means is to include the use of rigidly aligned fastener or bolt holes or bores in rigid reinforcing members or reinforcing means, or in other rigid braces, brackets, members or the like fastened to panels of the container.

Hinge tabs 48 are rigidly mounted so as to upstand vertically from the opposite ends of reinforcing bar 40 on rear panel 16b. Holes 48a are formed through hinge tabs 48 for journaling therethrough of a hinge rod or hinge pins mounted to lids 12a and 12b so that the lids may be pivoted on hinge tabs 48.

The refuse receiving dumpster of the present invention may be readily converted to a dumpster for receiving recyclable material such as paper, cardboard or the like in a manner which precludes ready insertion of non-recyclable waste material and refuse. As will be seen in Figures 14 and 15, a wedge-shaped side wall extension 60 has an elongated first leg 62 and a short second leg 64 projecting generally at right angles from wide end thereof. First leg and second legs 62 and 64 may be inserted within dumpster 10, with first leg 62 positioned adjacent to the vertical surface of sidewall reinforcing bars 32 and with second leg 64 positioned adjacent to the inside surface of front panel 16a. The upper edge 66 of legs 62 and 64 has an outwardly projection flange 70. The upper edge 66 of first leg 62 is downwardly sloped from its confluence with second leg 64 to the distal end of leg 62 to enable corresponding flange 70 to provide a sloped support for the outer edge of lid 12. The generally horizontally disposed flange on second leg 64 supports a portion of the front edge of the lid. Two side wall extensions are required as can be seen in Figure 12 and can be removably secured in place with bolts 72 or like fasteners which pass through mating apertures in both side wall extensions and reinforcing bar.

With the lid closed on top of the side wall extensions and secured in place by any suitable means against unwarranted elevation recycling material may easily inserted through the front opening 78. A suitable locking device, as illustrated is separate lengths of chain 80 or cable fixed at one end to each of the lids and removably securable at its other end
5 to a projecting lug 82 positioned medially of reinforcing tube 40 on front wall 16a.

Moreover, in interpreting both the specification and the claims, all terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms "comprises" and "comprising" should be interpreted as referring to elements,
10 components, or steps in a non-exclusive manner, indicating that the referenced elements, components, or steps may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced.

As will be apparent to those skilled in the art in the light of the foregoing
15 disclosure, many alterations and modifications are possible in the practice of this invention without departing from the spirit or scope thereof. Accordingly, the scope of the invention is to be construed in accordance with the substance defined by the following claims.